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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,748	03/21/2006	Koichi Aizawa	80080(302721)	3331
21874 7590 03/09/2010 EDWARDS ANGELL PALMER & DODGE LLP P.O. BOX 55874 BOSTON, MA 02205				
EXAMINER				
VU, DAVID HUNG				
ART UNIT		PAPER NUMBER		
2821				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/572,748

**Applicant(s)**

AIZAWA ET AL.

**Examiner**

David Hung Vu

**Art Unit**

2821

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 31 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 13, 20 and 21 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15 is/are allowed.
- 6) ☒ Claim(s) 1, 3-12, 14 and 16-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/06)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 12/31/09, 8/13/09, 5/4/09

## **DETAILED ACTION**

### ***Specification***

1. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
2. Claims 2 and 12 have been canceled. Claims 20-21 drawn to nonelected species should also be canceled.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,3-11,14, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito, US Pat No 6,236,156 in view of Hatai et al (hereinafter Hatai), US Pat No 6,285,118.

Ito inherently discloses the claimed invention comprising the steps of providing a cold-cathode electron emitter 5, which has the capability of emitting and accelerating electrons from a planar electron emitting portion according to tunnel effect; applying a voltage to the emitter to emit the electrons from the planar electron emitting portion; exposing the object 110,4 to the electrons; voltage applying means V1,V2,Eg,Ea; see, for example, abstract, figures 1-4,6, and 8, column 2, lines 11+, columns 5-6, column 7, lines 45+, column 9, lines 1-36. Ito does not explicitly disclose field drift layer including nanocrystalline silicon between the electrodes. Hatai discloses field drift layer

6 including nanocrystalline silicon between the electrodes (see, for example, abstract, figures 1-2,5,8,11-12, column 11, lines 3+, claim 4). It would have been obvious to one having ordinary skill in the art at the time of applicant's claimed invention was made to have employed such field drift layer; thus, electrons would have been attracted to the object faster.

Regarding claim 3, the selection of certain atmospheric pressure would have been considered obvious to one of ordinary skill in the art so as to enhance treatment efficiency and uniformity.

Regarding claims 5-6, the selection of certain electron energy levels, 1-50 keV or 1-100eV, would have been obvious to one having skill in the art at the time the invention was made since it has been held that where the general conditions of a claim are disclosed in the prior art, discovery the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 7, at least column 9, lines 1-37 of the Ito reference disclose such gas.

Regarding claims 8-9, selecting oxygen or nitrogen as well as a gas with smaller electron affinity than oxygen also would have been considered obvious to one of ordinary skill in the art so as to enhance treatment efficiency and uniformity.

Regarding claim 10, one of ordinary skill in the art would have known how to have placed the object in direct contact with the emitting portion since rearranging of part would have involved only routine skill in the art.

Regarding claim 11, it would have been obvious to one having ordinary skill in the art at the time of applicant's claimed invention was made to have provided an opening in the case; thus, electrons or activated gas would have been supplied through the same.

Regarding claim 14, one of ordinary skill would have known how to have employed an intake port; thus, means for supplying gas would have been realized.

Regarding claims 16-17, at least figure 2 shows anode 7a for accelerating the electrons.

Regarding claim 18, figure 11 shows the claimed arrangements of electrodes 31 and 7 and figure 5 shows voltage means  $V_c, V_{ps}$  for applying voltage to the electrodes.

3. Claims 1,3-11,14, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomoaki, JP Pat No 2002-049226 in view of Hatai.

Tomoaki inherently discloses the claimed invention comprising the steps of providing a cold-cathode electron emitter 6,16, which has the capability of emitting and accelerating electrons from a planar electron emitting portion according to tunnel effect; applying a voltage to the emitter to emit the electrons from the planar electron emitting portion; exposing the object 7a to the electrons; voltage applying means 8-9 and 18-19, see, for example, figures 3-5,8-10, pages 5-6,8-10, and 15 of the translation. Tomoaki does not explicitly disclose field drift layer including nanocrystalline silicon between the electrodes. Hatai discloses field drift layer 6 including nanocrystalline silicon between the electrodes (see, for example, abstract, figures 1-2,5,8,11-12, column 11, lines 3+, claim 4). It would have been obvious to one having ordinary skill in the art at the time of

applicant's claimed invention was made to have employed such field drift layer; thus, electrons would have been attracted to the object faster.

Regarding claims 4 and 7-8, at least pages 5-6,8,10 and 15 do disclose such atmospheric pressure and one of oxygen and nitrogen.

Regarding claims 5-6, the selection of certain electron energy levels, 1-50 keV or 1-100eV, would have been obvious to one having skill in the art at the time the invention was made since it has been held that where the general conditions of a claim are disclosed in the prior art, discovery the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 9, a gas with smaller electron affinity than oxygen also would have been considered obvious to one of ordinary skill in the art so as to enhance treatment efficiency and uniformity.

Regarding claim 10, one of ordinary skill in the art would have known how to have placed the object in direct contact with the emitting portion since rearranging of part would have involved only routine skill in the art.

Regarding claims 11 and 14, providing a casing with such opening would have been considered obvious to one of ordinary skill in the art. It would have been obvious to one having ordinary skill in the art at the time of applicant's claimed invention was made to have provided a casing having an opening therein; thus, electrons or activated gas would have been supplied through the same. One of ordinary skill would have known how to have employed an intake port; thus, means for supplying gas would have been realized.

Regarding claims 16-17, at least figures 3 and 9 show anode 7a for accelerating the electrons.

Regarding claim 18, figure 11 of the Hatai shows the claimed arrangements of electrodes 31 and 7 and figure 5 shows voltage means Vc,Vps for applying voltage to the electrodes.

Regarding claims 18-19, Figure 8, pages 9-10 of the Tomoaki do disclose such electrode arrangements and voltage supplying means. The employment of the selectors would have been considered obvious to one of ordinary skill in the art for the purpose of applying different voltages at different period of time to the electrodes.

***Allowable Subject Matter***

4. Claim 15 is allowed.

***Response to Arguments***

5. Applicant's arguments filed 12/31/2009 have been fully considered but they are not persuasive.

In response to applicant's arguments about non-analogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the Hatai reference is clearly directed to field emission type electron source; thus it is related to applicant's claimed electron source. The Tomoaki reference is also directed to an electron source device. It is directed to electron source, see, for example, column 5,

lines 44+, column 6, lines 5+, claims 1 and 11-12. One of ordinary skill the art would have known how to have employed these sources in different practical applications. Applicant should also note that a prima facie case of obviousness does not require that the prior art references necessarily recognize or even suggest the problem which applicant attempted to solve. In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990).

Furthermore, the limitation "...modifying an object with electrons..." is just intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Hung Vu whose telephone number is (571) 272-1831. The examiner can normally be reached on M-F 9:00am-5:30pm.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Hung Vu/  
Primary Examiner  
Art Unit 2821